

REMARKS/ARGUMENTS

Claims 1-10 are pending. No claim has been amended, canceled, or added.

The pending claims stand finally rejected based on new prior art after the Applicants had evidently addressed and overcome the prior art previously cited and applied by the Examiner. The Applicants wish to address the new grounds of rejection presented in the Final Office Action and therefore respectfully request entry of this response and full consideration of the arguments submitted herein.

Claims 1-3 and 5 stand finally rejected under section 35 § U.S.C. 102(e) as being unpatentable over Sawanobori et al. (US Patent 5,936,668). Claim 4 stands finally rejected under section 35 § U.S.C. 103(a) as being unpatentable over Sawanobori in view of Vogel (US Patent 5,668,596). Claims 6-10 stand finally rejected under section 35 § U.S.C. 103(a) as being unpatentable over Sawanobori in view of Sakaguchi (US Patent 5,534,916). The Applicants submit that the primary cited reference is deficient and further that any purported admission of prior art does not cure the deficiencies.

Claims 1-3 and 5

As stated in the specification, one of the purposes of the invention is to obtain a corrected image that improves luminance and white balance without degrading the image quality. As shown in Figures 1A and 1B, the corrected image is stored within memory for image processing or further output. Sawanobori does not teach or suggest storage of a corrected image in any way. In Figure 6 and column 5, lines 50-64, Sawanobori describes the processing of the image signal output through the white balance controlling circuits for display on the LCD. This is evident from the fact that the original signal is directly inputted into the A/D converter 34 as is, without any attempt at white balance correction. Thus, any white balancing performed in Sawanobori is temporary, as the corrected image is not stored or saved beyond the LCD output. Thus, the very purpose of the device of Sawanobori is different from that of the claimed invention.

In addition, claim 1 states that the luminance correction section "generates[s] individual correction coefficients for each said predetermined colors of each said pixel from a plurality of correction coefficients." Sawanobori, in contrast, does not describe the specific method by which white balancing of the image is done. In column 5, lines 54-57 Sawanobori states "in the first white balancing controlling circuit a gain of red (R) is adjusted, in the second . . . circuit a gain of green (G) is adjusted, and in the third . . . circuit (B) is adjusted." It does not specifically state that correction coefficients for the colors of each pixel are used in the image correction process or give any further details as to how the white balancing is performed. If each color had its own correction coefficient as stated by the Examiner (as opposed to each color of each pixel having a correction coefficient), certain portions of the corrected image would be overcorrected or undercorrected. The disclosure of Sawanobori is inadequate, since it lacks any guidance as to why specific coefficient schemes would be preferred or what the outcome would be. Thus, it would not direct one of skill in the art to solve the problem that has been addressed and solved by the claimed invention.

Additionally, Sawanobori makes no reference at all to any image processing steps done after the color image has been passed through the A/D converter. The claimed invention references other image processing steps such as color correction, edge extraction, and compression which may be applied for the image data read out from the storage sections. No explanation has been made whatsoever at all in Sawanobori on this concept as described by the claimed invention.

One other feature of the claimed invention that Sawanobori makes no reference to at all is the concept of correcting and maintaining the signal in an analog state, as shown in Figure 1b of the current application. In Sawanobori, it is clearly shown in Figure 6 that storage of the signal is done in a digital medium, as the image signal is converted into a digital signal by an A/D converter. The advantages of storing the image as an analog signal include providing additional image processing options even after storage into a medium. With a digital signal, information of details is lost by quantization, thus reducing the image quality of any later image processing operations.

For the reasons mentioned above, claim 1 is allowable.

Claims 2, 3, and 5 are dependent from claim 1 and are allowable for at least the same reasons mentioned above.

Claim 4

In Vogel, the pre-processing section 34 and post-processing section 50 are being compared to the first and second control sections and the luminance amplification section of Claim 4 in the claimed invention whereby a gain is set as a product of the luminance correction amounts generated by the two control sections. However, the state of the signals being processed in Vogel and the invention are significantly different. In column 5, lines 50-55, Vogel states that "Image-wise signals S_1-S_N from the CCD images are converted to digital, linear RGD format within the camera by the pre-processing signal 34.". Thus the output from the pre-processing section to the color correction matrix in Vogel is clearly a digital signal. This contrasts with the claimed invention in that all luminance correction and white balance processing is done on the analog signal. As can be seen in Figure 1A with regards to Figure 15B in the claimed invention, the output 5B of the luminance correction section 10C is maintained as an analog signal until it reaches the A/D conversion section 8.

Additionally, in column 6, lines 11-17, Vogel does not discuss the correction of white balance in an analog signal in the post-processing section. Lines 15-17 of Vogel state, "such processing operations may include such tasks as interpolation, edge-enhancement, and tone-scale remapping, for example." As these tasks are commonly attributed to digital image processing, that the image processed in the post-processing section of Vogel presumably is a digital image, not analog as in the claimed invention. This presumption is supported since no A/D conversion is done between the pre- and post- processing sections.

Furthermore, Vogel makes no description at all of the device shown in Figure 1B where the signal is maintained in an analog state throughout the entire process from input into the image sensing device to storage in memory. The advantages of this are stated in more detail above, in that no information of details regarding the image is lost through quantization.

For the reasons mentioned above, claim 4 is allowable.

Claims 6-10

Sakaguchi has been cited for teaching use of two-dimensional coordinates within the image to generate a correction amount, and for teaching that such is preferred in order to correct shading problems created by a lens. The Applicants first note that the solution offered by Sakaguchi creates a problem overcome by the claimed invention. Sakaguchi teaches a method wherein color correction and peripheral sensitivity correction are separate problems that are dealt with in separate processes. The solution taught by Sakaguchi would not solve the problem addressed by the invention. Moreover, the solution offered by the claimed invention would deal with the problems identified by Sakaguchi more effectively than Sakaguchi. In the present invention, since the correction is performed on the analog signal, the correction of sensitivity differences of the RGB components and the correction of periphery sensitivity is handled simultaneously even before the signal is converted to digital form. Thus, no false contours or false colors are generated, as is the case when the periphery sensitivity correction is performed after digital conversion and only on brightness data. Claims 6-10, therefore, are allowable. Additionally, claims 6-10 depend from claim 1 and are allowable for at least the same reasons as claim 1.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Steve Y. Cho
Reg. No. 44,612

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor, San Francisco, CA 94111-3834
Tel: 650-326-2400 / Fax: 415-576-0300
SYC:dlw

60438365 v1